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(54) Title: FERMENTATION OF PENTOSE SUGARS

(57) **Abstract:** The present invention relates to host cells transformed with a nucleic acid sequence encoding a eukaryotic xylose isomerase obtainable from an anaerobic fungus. When expressed, the sequence encoding the xylose isomerase confers to the host cell the ability to convert xylose to xylulose which may be further metabolised by the host cell. Thus, the host cell is capable of growth on xylose as carbon source. The host cell preferably is a eukaryotic microorganism such as a yeast or a filamentous fungus. The invention further relates to processes for the production of fermentation products such as ethanol, in which a host cell of the invention uses xylose for growth and for the production of the fermentation product. The invention further relates to nucleic acid sequences encoding eukaryotic xylose isomerases and xylulose kinases as obtainable from anaerobic fungi.